**Instructions**: Complete each of the following exercises.

## Introduction to Vectors

1. Compute the vector given by the directed line segment $\overrightarrow{AB}$ for points $A$ and $B$ given below.

   (a) $A = (0, 3, 1)$, $B = (2, 3, -1)$

   (b) $A = (0, 6, -1)$, $B = (3, 4, 4)$

2. Compute $\mathbf{u} + \mathbf{v}$, $2\mathbf{u} - 3\mathbf{v}$, and $5\mathbf{v} - \mathbf{u}$ for $\mathbf{u}, \mathbf{v}$ below; do so both geometrically and algebraically.

   (a) $\mathbf{u} = \langle -3, 4 \rangle$, $\mathbf{v} = \langle 2, 1 \rangle$

   (b) $\mathbf{u} = \langle 1, -2 \rangle$, $\mathbf{v} = \langle 1, 1 \rangle$

3. Find the unit vector in the direction of the given vector.

   (a) $8\mathbf{i} - \mathbf{j} + 4\mathbf{k}$

   (b) $-5\mathbf{i} + 3\mathbf{j} - \mathbf{k}$

   (c) $\langle 1, 2, 3 \rangle$

4. Find the vector that has the same direction as $\langle 6, 2, -3 \rangle$ but has length 4.